

PATENT ABSTRACTS OF JAPAN

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(54) COOLING METHOD FOR PLASMA DISPLAY PANEL IN AGING AND COOLING DEVICE USED FOR THE PLASMA DISPLAY PANEL

(57)Abstract:

PROBLEM TO BE SOLVED: To provide a cooling method and a cooling device for a plasma display panel 20 in aging, which enable an operator to age the plasma display panel 20 without causing cracks in its panel surface.

SOLUTION: A blower 2 is disposed below the plasma display panel 20, and it is moved in parallel with a rear plane of the plasma display panel 20. A partial temperature rise in the plasma display panel is suppressed by blowing uniformly the rear plane of the plasma display panel with air sent by a motor 4 from the blower 2 which is moved in reciprocating directions.

DETAILED DESCRIPTION

[Detailed Description of the Invention]

[0001]

[Field of the Invention]

This invention relates to the aging cooling method and aging cooling system of PDP which cool the panel of PDP in the aging (aging) of a plasma display (hereafter referred to as "PDP").

[0002]

[Description of the Prior Art]

Generally, PDP encloses discharge gas, after the assembly, a panel is made to turn on all the discharge cells in a display surface continuously over predetermined time, and aging is performed on it.

Discharge is stable, while the layer part of a dielectric layer is defecated physically and chemically, firing potential falls and a drive becomes easy by performing this aging.

[0003]

Thus, in PDP, in order to perform image display using plasma discharge, the square which is carrying out image display originates in plasma discharge, and has considerable generation of heat. In particular, since this calorific value is the quantity according to the light and darkness of the display image, if it sees as the whole surface of a panel, the unevenness of a local temperature according to image display will produce it. As a result, big heat distortion arises selectively in a glass substrate, and there is a problem that a crack arises in a glass substrate. For this reason, in the aging equipment which makes a cell turn on for a long time, the fan needs to be arranged at the back of a panel and the panel needed to be cooled compulsorily.

[0004]

The easy thing which there is no equipment of especially exclusive use [a panel / cooling system], and attached two or more small fan during this aging at the sheet member of the size equivalent to a panel was used. And the aging tray of the panel was carried on the stand, the cooling system has been arranged caudad, and it energized in all the cells of the PDP panel attached to the aging tray, and aging was performed, cooling the PDP panel by air blasting of a fan.

[0005]

[Problem(s) to be Solved by the Invention]

However, since it was dotted with fan ** attached to a sheet member and it had been arranged in this simple cooling system, there was a problem that the temperature unevenness that the portion in which the portion by which a fan is not arranged carries out a rise in heat and by which it is ventilated cools arose. This temperature unevenness becomes large in connection with the passage of time, the glass plate of PDP is cracked, and there is a problem that it will be destroyed by the time it continues till aging time.

[0006]

This cooling system is inefficient and working two or more fans simultaneously moreover has the fault that consumption of energy becomes large and operation cost becomes high.

[0007]

Therefore, the purpose of this invention is to provide the aging cooling method and aging cooling system of a plasma display which can carry out aging of the PDP panel, without making a PDP panel surface produce a crack, while being able to apply with saving resources.

[0008]

[Means for Solving the Problem]

An aging tray which energizes the feature of this invention to each electrode of said plasma display panel via a clamping circuit which presses down each side of a plasma display panel and is fixed, and each clamping circuit and to which aging of said plasma display panel is carried out. It is an aging cooling method of a plasma display which cools said plasma display panel by ventilating having a fan which ventilates air towards the back of said plasma display panel, and moving said fan to said plasma

display panel and parallel. moreover

As for movement of said fan, it is desirable that it is reciprocation moving.

[0009]

An aging tray which energizes other features of this invention to each electrode of said plasma display panel via a clamping circuit which presses down each side of a plasma display panel and is fixed, and each clamping circuit and to which aging of said plasma display panel is carried out. It is a plasma display aging cooling system provided with a fan which ventilates air towards the back of said plasma display, and said plasma display and a moving mechanism to which parallel are made to move said fan.

[0010]

It is desirable to have a switching mechanism which said fan makes parallel carry out reciprocation moving to said plasma display. As for the source of power of said moving mechanism, it is desirable to obtain from a motor made to rotate said fan. while a blowing opening of said fan is the rectangular shape extended in the move direction of said fan, and the direction which intersects perpendicularly preferably on the other hand -- the length of a neighborhood of said direction of said plasma display panel -- ** -- it is long. As for said fan, it is desirable that it is one set.

[0011]

[Embodiment of the Invention]

Next, this invention is explained with reference to drawings.

[0012]

Drawing 1 is a perspective view showing the plasma display aging cooling system in the 1 embodiment of this invention. This plasma display aging cooling system is provided with the following.

The clamping circuits 1a, 1b, 1c, and 1d which press down each side of the PDP panel 20 and are fixed as shown in drawing 1.

The aging tray 1 to which it energizes to each electrode of the PDP panel 20 via each clamping circuits 1a, 1b, 1c, and 1d, and aging of said plasma display panel is carried out.

The fan 2 which is arranged under the stand 3 and ventilates air towards the back of the PDP panel 20.

The moving mechanism to which the fan 2 is moved in parallel with the PDP panel 20.

[0013]

The moving mechanism to which the fan 2 is moved is provided with the following.

The gearbox 8 which transmits the rotation from the axis of rotation of the motor 4, and slows down revolving speed.

The rack 6 which gears with the pinion drawn from the gearbox 8.

The guide bar 5 to which it shows movement of the fan 2.

The motor 4 and the gearbox 8 are connected so that it may unite with the fan 2, and they move with the fan 2. The rack 6 and the guide bar 5 are attached to the base plate 17 so that it may not interfere in movement of the fan 2.

[0014]

The air inhaled from the inlet port 10 is discharged from the blowing opening 9 of rectangular shape. the size of the longitudinal direction of the blowing opening 9 -- the size of the cross direction of the PDP panel 20 -- ** -- a large thing is desirable. As for the fan 2, one set is desirable when the point of the simplification of operation cost and structure is taken into consideration.

[0015]

On the other hand, the clamping circuit 1a which constitutes the aging tray 1 has an electrode energized for the scanning terminal of the PDP panel 20. The clamping circuit 1c which clamps the side of the PDP panel 20 which counters this clamping circuit 1a has an electrode which presses down the common terminal of the PDP panel 20. The clamping circuit 1b and the clamping circuit 1d have an electrode for energizing to the data terminal of the PDP panel. And it energizes by the aging drive

circuit which is not illustrated to each clamps 1a, 1b, 1c, and 1d, all the cells of the PDP panel 20 operate, and aging is performed.

[0016]

Drawing 2 is a figure showing the neighborhood of a gearbox of drawing 1. The bevel gear 16a is attached to the axis of rotation 7 of the motor 4 made to rotate the shuttlecock of the fan 2. The gearbox 8 is equipped with the reduction gears 11 with the bevel gear 16a and the gearing bevel gear 16b as shown in drawing 2. And the bevel gear 16e rotates via the bevel gear 16c attached to the output shaft of the reduction gears 11, and the gearing bevel gear 16d, and rotation is transmitted to the pinion 12. Thus, the rotational motion power of the one motor 4 is used also [locomotive faculty / of the fan 2].

[0017]

The clutch 14 is operated so that the bevel gear 16d may be made to slide to the spline shaft 13 and it may gear to the bevel gear 16e. And if the clutch 14 is turned off, by energization of a built-in spring, it will retreat and engagement of the bevel gear 16d, the bevel gear 16e, and the bevel gear 16c will separate. If the clutch 15 is energized, the bevel gear 16f will slide on the spline-shaft 13 top, will gear with the bevel gear 16e and the bevel gear 16c, and will rotate the pinion 12 to a counter direction.

[0018]

Since the bevel gear 16f from which it separated from the bevel gear 16c by using this spline shaft 13 is also rotating by the bevel gear 16c and the gearing bevel gear 16d, Since rotation of each bevel gears 16c, 16d, 16e, and 16f can take a synchronization, the change of a hand of cut can be performed smoothly.

[0019]

Drawing 3 (a) and (b) is a figure explaining operation of the plasma display aging cooling system of drawing 1. First, the clutch 14 of the gearbox 8 shown in drawing 2 starts in the state of one.

Ventilating the PDP panel 20 under aging, the fan 2 moves the fan 2 in the direction of an arrow with the rack 6 with which the pinion 12 rotates and gears, as shown in drawing 3 (a).

[0020]

Next, when the fan 2 reaches at a stroke end, as the limit switch which is not illustrated operates, the clutch 14 of drawing 2 turns off, the clutch 15 operates, the hand of cut of the pinion 12 changes and the fan 2 is shown in drawing 3 (b), It moves in the direction of an arrow, ventilating the PDP panel 20.

[0021]

If the fan 2 reaches at the stroke end shown in drawing 3 (a), the limit switch operates, the clutch 15 of drawing 2 turns off, the clutch 14 will operate, the hand of cut of the pinion 12 will return to the original positive rotation, and the fan 2 will move in the direction of an arrow.

[0022]

Such by [of the fan 2] carrying out reciprocation moving repeatedly, the PDP panel 20 under aging is cooled uniformly, and a rise in heat is controlled selectively.

[0023]

[Effect of the Invention]

The air which this invention forms the fan which moves in parallel with the PDP panel as explained above, and is sent from a fan by spraying the field of the PDP panel uniformly, The partial rise in heat of the PDP panel is controlled, the temperature unevenness of it is lost, breakage of the PDP panel becomes that there is nothing, and it is effective in the ability to aim at improvement in the yield.

[Brief Description of the Drawings]

[Drawing 1] It is a perspective view showing the plasma display aging cooling system in the 1 embodiment of this invention.

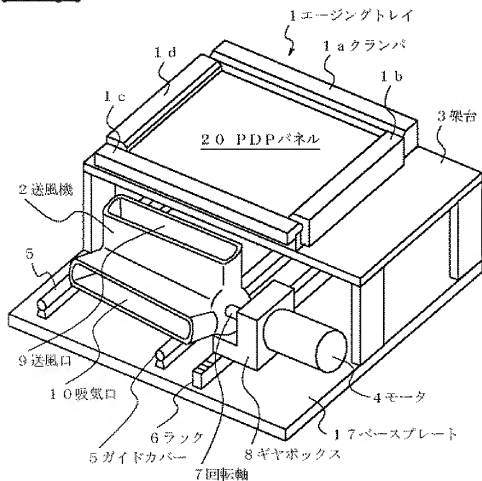
[Drawing 2] It is a figure showing the neighborhood of a gearbox of drawing 1.

[Drawing 3] It is a figure explaining operation of the plasma display aging cooling system of drawing 1.

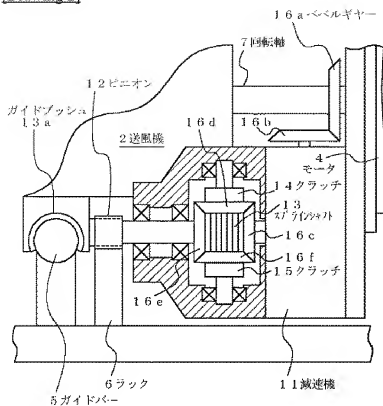
[Description of Notations]

- 1 Aging tray
- 1a, 1b, 1c, 1d Clamping circuit
- 2 Fan
- 3 Stand
- 4 Motor
- 5 Guide bar
- 6 Rack
- 7 Axis of rotation
- 8 Gearbox
- 9 Blowing opening
- 10 Inlet port
- 11 Reduction gears
- 12 Pinion
- 13 Spline shaft
- 14, 15 Clutch
- 16a, 16b, 16c, 16d, 16e, 16f Bevel gear
- 17 Base plate
- 20 PDP panel

[Drawing 1]

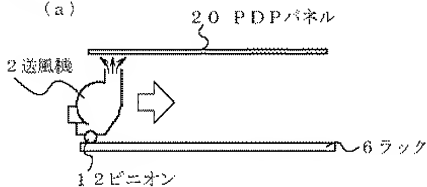


[Drawing 2]

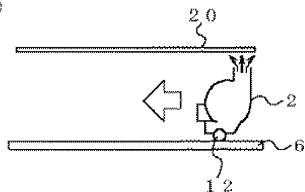


[Drawing 3]

(a)



(b)



[Claim(s)]

[Claim 1]

An aging cooling method of a plasma display cooling said plasma display panel by ventilating having the following and moving said fan to said plasma display panel and parallel.

An aging tray to which it energizes to each electrode of said plasma display panel via a clamping circuit which presses down each side of a plasma display panel and is fixed, and each clamping circuit, and aging of said plasma display panel is carried out.

A fan which ventilates air towards the back of said plasma display panel.

[Claim 2]

An aging cooling method of the plasma display according to claim 1, wherein movement of said fan is reciprocation moving.

[Claim 3]

A plasma display aging cooling system comprising:

An aging tray to which it energizes to each electrode of said plasma display panel via a clamping circuit which presses down each side of a plasma display panel and is fixed, and each clamping circuit, and aging of said plasma display panel is carried out.

A fan which ventilates air towards the back of said plasma display.

A moving mechanism to which said plasma display panel and parallel are made to move said fan.

[Claim 4]

The plasma display aging cooling system according to claim 3 provided with a switching mechanism which said fan makes parallel carry out reciprocation moving to said plasma display panel.

[Claim 5]

The plasma display aging cooling system according to claim 3 or 4 acquiring the source of power of said moving mechanism from a motor made to rotate said fan.

[Claim 6]

while a blowing opening of said fan is the rectangular shape extended in the move direction of said fan, and the direction which intersects perpendicularly -- the length of a neighborhood of said direction of said plasma display panel -- ** -- claim 3 characterized by a long thing, and the plasma display aging cooling system according to claim 4 or 5.

[Claim 7]

Claim 3, wherein the number of said fans is one, claim 4, the plasma display aging cooling system according to claim 5 or 6.